

1 **CLAIMS**

2 1. A client comprising:

3 a processor;

4 a memory;

5 one or more output devices;

6 a content player stored in the memory and executed on the processor to
7 play content in the one or more output devices;

8 an operating system stored in the memory and executed on the processor,
9 the operating system having processing tools for processing the content in support
10 of the content player; and

11 a scrambling system to scramble the content before the content is processed
12 by the processing tools of the operation system and to unscramble the content after
13 the content is processed by the processing tools of the operation system.

14
15 2. A client as recited in claim 1, wherein the processing tools comprises
16 a filter graph with one or more filters that process the content.

17
18 3. A client as recited in claim 1, wherein the content player receives the
19 content in an encrypted and compressed format, the content player decrypting and
20 decompressing the content.

21
22 4. A client as recited in claim 1, wherein the scrambling system adds
23 noise to the content.
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1 5. A client as recited in claim 1, wherein the scrambling system XORs
2 at least a subset of content with a random stream of bits.

3
4 6. A client as recited in claim 1, wherein the scrambling system
5 transforms the content using one of time-domain or frequency-domain scrambling.

6
7 7. A client as recited in claim 1, wherein the operating system has at
8 least one driver for the output devices and the scrambling system comprises:

9 a scrambler resident at the content player to scramble the content to
10 produce scrambled content; and

11 a descrambler resident at the driver to unscramble the scrambled content to
12 recover the content.

13
14 8. A client as recited in claim 1, wherein the scrambling system adds a
15 random signal to the content to produce scrambled content and subtracts the
16 random signal from the scrambled content to recover the content.

17
18 9. A client as recited in claim 1, wherein the scrambling system adds a
19 periodic sync tone and a random signal to the content to produce scrambled
20 content and subtracts the sync tone and the random signal from the scrambled
21 content to recover the content.

22
23 10. A client as recited in claim 1, wherein the scrambling system utilizes
24 at least one key to scramble the content.

1 11. A client as recited in claim 1, wherein the scrambling system
2 comprises:

3 a tone generator to create periodic sets of tone patterns having varying
4 amplitudes based on a first key;

5 a first random number generator to create a random signal based on the first
6 key and a second key;

7 an adder to add the tone patterns and the random signal to the content to
8 produce scrambled content;

9 a tone detector to detect the tone patterns in the scrambled content and
10 recover the first key from the varying amplitudes of the tone patterns;

11 a second random number generator to create a random signal based on the
12 recovered first key and the second key; and

13 a subtractor to subtract the tone patterns and the random signal from the
14 scrambled content to restore the content.

15
16 12. A client as recited in claim 11, wherein the second key is passed via
17 a channel separate from the scrambled content.

18
19 13. A client as recited in claim 11, wherein the second key is exchanged
20 between the first and second random number generator over a secured path.

21
22 14. A client as recited in claim 1, wherein the scrambling system is
23 implemented in software stored in the memory and executed on the processor.

1 **15.** A content scrambler for scrambling content, comprising:
2 a tone generator and modulator to create periodic sets of tone patterns and
3 to modulate amplitudes of the sets based on a first key;
4 a random number generator to create a random signal based on the first key
5 and a second key; and
6 an adder to add the sets of tone patterns and the random signal to the
7 content to produce scrambled content.

8
9 **16.** A content scrambler as recited in claim 15, wherein the tone
10 generator and modulator modulates the amplitudes in a way that embeds the first
11 key into the sets of tone patterns.

12
13 **17.** A content scrambler as recited in claim 15, wherein the tone
14 generator and modulator produces the tone patterns with one of two amplitudes,
15 wherein tone patterns with a first amplitude represent a first binary value and tone
16 patterns with a second amplitude represent a second binary value, the first key
17 being encoded into the sets of tone patterns as an aggregate of the first and second
18 binary values.

19
20 **18.** A content scrambler as recited in claim 15, wherein the second key
21 is encrypted for secure transportation to a descrambler.

22
23 **19.** A media player for playing multimedia content, comprising the
24 content scrambler of claim 15.
25

1 **20.** An operating system comprising the content scrambler of claim 15.

2
3 **21.** A content descrambler for unscrambling scrambled content,
4 comprising:

5 a tone detector and demodulator to detect periodic sets of tone patterns in
6 the scrambled content and to demodulate amplitudes of the sets to recover a first
7 key;

8 a random number generator to create a random signal based on the
9 recovered first key and a second key; and

10 a subtractor to subtract the tone patterns and the random signal from the
11 scrambled content to recover content.

12
13 **22.** A content descrambler as recited in claim 21, wherein the tone
14 patterns have one of two amplitudes so that tone patterns with a first amplitude
15 represent a first binary value and tone patterns with a second amplitude represent a
16 second binary value, the tone detector and demodulator using the first and second
17 binary values from the varying amplitudes to recover the first key.

18
19 **23.** A content descrambler as recited in claim 21, wherein the second
20 key is received separately from the scrambled content.

21
22 **24.** An operating system comprising the content scrambler of claim 21.
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1 **25.** A scrambling architecture for protecting content distributed by a
2 content provider over a network to a client, comprising:

3 a content scrambler to scramble the content using first and second keys to
4 produce scrambled content, the scrambler embedding the first key into the
5 scrambled content and passing the second key separate from the scrambled
6 content;

7 a content descrambler to recover the first key from the scrambled content
8 and to receive the second key, the descrambler unscrambling the scrambled
9 content using the first and second keys to recover the content.

10
11 **26.** A scrambling architecture as recited in claim 25, wherein the
12 content scrambler and the content descrambler are implemented in software.

13
14 **27.** A scrambling architecture as recited in claim 25, wherein the
15 content scrambler is implemented at the content provider, so that the content is
16 scrambled prior to distribution over the network to the client.

17
18 **28.** A scrambling architecture as recited in claim 25, wherein the
19 content scrambler is implemented at the client, so that the content is scrambled at
20 the client after distribution over the network from the content provider.

21
22 **29.** A scrambling architecture as recited in claim 25, wherein the
23 content descrambler is implemented within an operating system at the client.

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1 **30.** A scrambling architecture as recited in claim 25, wherein the
2 content descrambler is implemented within a driver at the client.

3
4 **31.** A scrambling architecture as recited in claim 25, wherein the
5 content scrambler passes the second key to the content descrambler over a
6 cryptographically secured path.

7
8 **32.** A scrambling architecture as recited in claim 25, wherein the
9 content scrambler comprises:

10 a tone generator and modulator to create periodic sets of tone patterns and
11 to modulate amplitudes of the sets based on the first key;

12 a random number generator to create a random signal based on the first and
13 second keys; and

14 an adder to add the sets of tone patterns and the random signal to the
15 content to produce the scrambled content.

16
17 **33.** A scrambling architecture as recited in claim 32, wherein the tone
18 generator and modulator modulates the amplitudes in a way that embeds the first
19 key into the sets of tone patterns.

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1 34. A scrambling architecture as recited in claim 32, wherein the tone
2 generator and modulator produces the tone patterns with one of two amplitudes,
3 wherein tone patterns with a first amplitude represent a first binary value and tone
4 patterns with a second amplitude represent a second binary value, the first key
5 being encoded into the sets of tone patterns as an aggregate of the first and second
6 binary values.

7
8 35. A scrambling architecture as recited in claim 32, wherein the
9 content descrambler comprises:

10 a tone detector and demodulator to detect the periodic sets of tone patterns
11 in the scrambled content and to demodulate the amplitudes of the sets to recover
12 the first key;

13 a random number generator to create a random signal based on the
14 recovered first key and the second key; and

15 a subtractor to subtract the tone patterns and the random signal from the
16 scrambled content to recover the content.

17
18 36. A client-server system for protecting content, comprising:

19 a client;

20 a server to serve content to the client, the server having an encoder to
21 encrypt and compress the content to produce encoded content;

22 the client receiving the encoded content from the server and having a
23 decoder to decrypt and decompress the encoded content to recover the content;
24
25

1 the client having a scrambler to scramble the content after decryption and
2 decompression, the content remaining scrambled while processed by the client;
3 and

4 the client further having a descrambler to unscramble the content after
5 processing for subsequent playing.

6
7 37. A client-server system as recited in claim 36, wherein the client is
8 equipped with a media player to play the content, processing tools to support the
9 media player, and a driver; the scrambler being implemented as part of the media
10 player and the descrambler being implemented as part of the driver.

11
12 38. A client-server system as recited in claim 36, wherein the client runs
13 an operating system, and the content is scrambled while being handled by the
14 operating system.

15
16 39. A method for protecting content within a computer device,
17 comprising:

18 receiving encoded content;
19 decoding the encoded content to recover the content;
20 scrambling the content after the decoding;
21 processing the content while scrambled;
22 descrambling the content after the processing; and
23 playing the content.
24
25

1 40. A method as recited in claim 39, wherein the scrambling comprises
2 adding noise to the content.

3
4 41. A method as recited in claim 39, wherein the scrambling comprises
5 XORing at least a subset of the content with a random stream of bits.

6
7 42. A method as recited in claim 39, wherein the scrambling comprises
8 transforming the content using one of time-domain or frequency-domain
9 transforms.

10
11 43. A method as recited in claim 39, wherein the scrambling comprises:
12 adding sets of sync tones periodically to the content; and
13 adding a random signal to the content.

14
15 44. A method as recited in claim 43, wherein the descrambling
16 comprises:

17 detecting the sets of sync tones in the content;
18 subtracting the sync tones from the content; and
19 subtracting the random signal from the content.

20
21 45. A method as recited in claim 39, wherein the scrambling comprises:
22 producing periodic sets of tone patterns having varying amplitudes based
23 on a first key;

24 generating a random signal based on the first key and a second key; and
25 adding the tone patterns and the random signal to the content.

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2 **46.** A method as recited in claim 45, wherein the descrambling
3 comprises:

4 detecting the tone patterns in the content;
5 recovering the first key from the varying amplitudes of the tone patterns;
6 generating a random signal based on the recovered first key and the second
7 key; and
8 subtracting the tone patterns and the random signal from the scrambled
9 content to restore the content.

10
11 **47.** A method as recited in claim 39, wherein the processing comprises
12 passing the content through a filter graph.

13
14 **48.** A computer-readable medium having computer-executable
15 instructions for performing the method of claim 39.

16
17 **49.** A method for delivering content from a server to a client over a
18 network, comprising:

19 encoding the content at the server;
20 serving the content from the server to the client;
21 decoding the content at the client;
22 scrambling the content after the decoding;
23 processing the content while scrambled;
24 descrambling the content after the processing; and
25 playing the content.

1
2 **50.** A method as recited in claim 49, wherein the scrambling comprises:
3 adding sets of sync tones periodically to the content; and
4 adding a random signal to the content.
5

6 **51.** A method as recited in claim 50, wherein the descrambling
7 comprises:
8 detecting the sets of sync tones in the content;
9 subtracting the sync tones from the content; and
10 subtracting the random signal from the content.
11

12 **52.** A method for delivering content from a server to a client over a
13 network, comprising:
14 scrambling the content at the server to produce scrambled content;
15 compressing the scrambled content at the server;
16 serving the compressed, scrambled content from the server to the client;
17 decompressing the compressed, scrambled content at the client to recover
18 the scrambled content;
19 processing the scrambled content;
20 descrambling the scrambled content after the processing to recover the
21 content; and
22 playing the content.
23
24
25

1 **53.** A method as recited in claim 52, wherein the scrambling comprises:
2 producing periodic sets of tone patterns having varying amplitudes based
3 on a first key;

4 generating a random signal based on the first key and a second key; and
5 adding the tone patterns and the random signal to the content.

6
7 **54.** A method as recited in claim 53, wherein the descrambling
8 comprises:

9 detecting the tone patterns in the content;

10 recovering the first key from the varying amplitudes of the tone patterns;

11 generating a random signal based on the recovered first key and the second
12 key; and

13 subtracting the tone patterns and the random signal from the scrambled
14 content to restore the content.

15
16 **55.** A computer-readable medium having computer-executable
17 instructions for:

18 producing periodic sets of tone patterns having varying amplitudes based
19 on a first key;

20 generating a random signal based on the first key and a second key; and

21 adding the tone patterns and the random signal to the content to scramble
22 the content.

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1 **56.** A computer-readable medium as recited in claim 55 further having
2 computer-executable instructions for:

3 detecting the tone patterns in the content;
4 recovering the first key from the varying amplitudes of the tone patterns;
5 generating a random signal based on the recovered first key and the second
6 key; and

7 subtracting the tone patterns and the random signal from the scrambled
8 content to restore the content.

9
10 **57.** A computer-readable medium having computer-executable
11 instructions for:

12 detecting periodic sets of tone patterns within scrambled content, the tone
13 patterns having varying amplitudes that were modulated based on a first key;

14 recovering the first key from the varying amplitudes of the tone patterns;
15 generating a random signal based on the recovered first key and the second
16 key; and

17 subtracting the tone patterns and the random signal from the scrambled
18 content to produce unscrambled content.